The Discovery of *Monardella angustifolia* at Leslie Gulch

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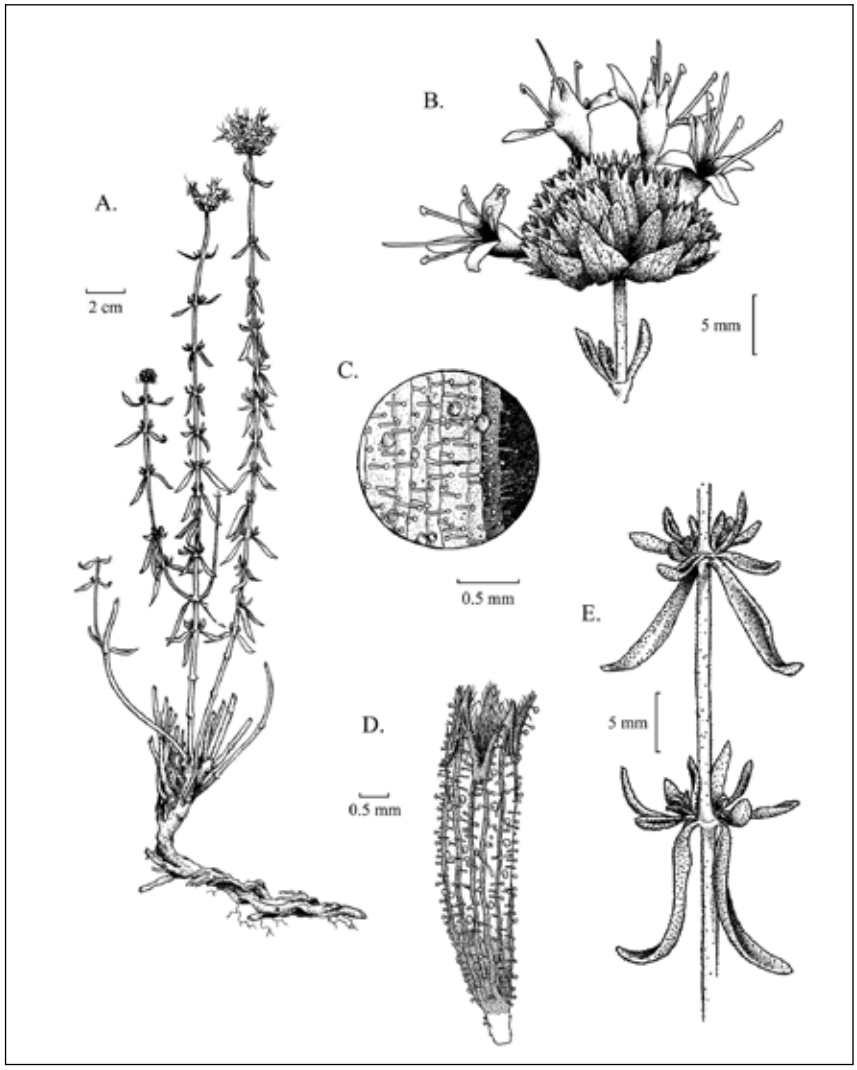
Leslie Gulch in southeastern Oregon has been a source of botanical curiosity for decades—ever since the new road was punched down Runaway Gulch from the vicinity of Succor Creek in the early 1970s, replacing the old wagon road from Rockville to Watson. Leslie Gulch is a caldera (an old collapsed volcanic eruptive center) containing outcrops of volcanic ash-tuff of assorted colors and is home to several endemic plant species. And just in the past few years, Mark Elvin, Barbara Ertter and I described another new species endemic to Leslie Gulch—*Monardella angustifolia*, narrow-leaved monardella (Elvin et al. 2014). It is reasonable to ask: how can new species still be found? I shall attempt to answer that question in this article by describing the process by which this new species came to our attention and how it came to be described.

The first botanical collection of this plant was made in 1973 by Pat Packard, former College of Idaho biology professor and long-time Idaho/Oregon botanist. It had been collected in nearly every decade since then, too. The plant, in the mint family (Lamiaceae), looks and smells like mountain monardella *(Monardella odoratissima)*. Mountain monardella is a common subshrub throughout our region with oval leaves, pink-purple to whitish flowers, and a wonderful fragrance. The Leslie Gulch plants have been included under that species by the authors of the Intermountain Flora, an authoritative treatment whose coverage includes the Leslie Gulch area (Cronquist et al. 1984). That is, the Leslie Gulch plants were considered just an extreme form of that well-known, highly variable species. In variable species like mountain monardella, it is often hard to determine whether certain combinations of characteristics are discrete, that is, with several characteristics all being similar together in only certain locations or habitats, or whether the characteristics vary in the manner of a "smear" (continuous), with no obvious corresponding association with geography or ecology. In the case of the Leslie Gulch plants, do monardellas with narrow, reflexed, and bundled leaves all occur together in a certain area or in particular habitats, or are they just spread throughout the range of the species, gradually changing from one form to another? If the former, then this may be a new species, isolated from other species and likely breeding only among themselves in a particular place or habitat. If the latter, then these variations are among the many that are just remixing as plants interbreed and make new forms through sexual recombination. Barbara and I had both thought, from the time of



Monardella angustifolia—narrowleaved monardella. A. Habit sketch. B. Inflorescence. C. Glandular hairs on the stem. D. Calyx of the flower showing glandular hairs. E. The opposite leaves, characteristic of the mint family, are narrow, folded, and bundled. Artwork by Alexa DiNicola.

Monardella angustifolia, narrowleaved monardella on Leslie Gulch ashtuff. Photo by Alexa DiNicola.

our earliest conversations about this Leslie Gulch plant in the mid-1990s, that this was probably a new species. But without a study of the variation throughout the whole range of mountain monardella from Utah and California up into southern British Columbia, there would be no way to test that hypothesis. And neither of us had the time or inclination to undertake such a study.

Like so many "new" species that are described, there is a long lag between when botanists become aware of some unusual forms and the time that such forms may be described and named as new to science. In fact, the average lag time between first collection of a new plant species and when that species is first described is 24 years (Bebber et al. 2010). In the case of narrow-leaved monardella, the lag time was a bit over 40 years. Specimens of this lovely Leslie Gulch endemic were included under the name *M. odoratissima* between 1973 and 2013 when Mark Elvin, living in southern California, contacted Barbara and me asking about these plants while he was working on the treatment of species in the genus *Monardella* for the new *Flora of Oregon*. In his study of the variation in this genus, he had come to suspect that the Leslie Gulch plants might be distinctive. So Barbara and I, with others, sought new specimens, researched various aspects of the distribution, and corresponded about everything from habitat, location of collections, and associated plant species, to minute glandular hairs on the calyx.

After observing the morphologies of more than 30 *Monardella* species throughout western North America, Mark realized that not only did the narrow, bundled and folded leaves of the Leslie Gulch plants (see Figure 1) distinguish them from mountain monardella, so too did the size of the aromatic glands on the calyx of the flowers and the presence of some additional layers of bracts in the inflorescence. In fact, the plants most similar to our Leslie Gulch populations (a species called *M. eplingii*) occur in the Mojave Desert over 900 km to the south. And that Mojave species, like the new Leslie Gulch species, is restricted to volcanic ash-tuff outcrops! Is that because they both evolved similar morphologies in parallel on similar substrates in distant locations? Resolving one question seems to just lead to more and more interesting questions.

So, like the discovery of so many new plant species, the "new" species was under our noses for decades. It just took a keen eye and careful examination of all related specimens to finally realize that a certain, odd-looking form was instead a new Leslie Gulch endemic, joining the group of other Leslie Gulch endemic species including Ertter's butterweed *(Senecio ertterae)*, Packard's blazingstar *(Mentzelia packardiae)*, Owyhee clover *(Trifolium owyheense)*, yellow phacelia *(Phacelia lutea* var. *mackenzieorum)*, and Grime's ivesia *(Ivesia rhypara* var. *rhypara)*.

While looking for populations of this plant over a larger geographic area, up into the Succor Creek drainage,

Monardella angustifolia flower head. Photo by Gerald Carr, June 4, 2016, in Malheur County, Oregon.

Stems and leaves of *Monardella angustifolia*. Photo by Gerald Carr.

the College of Idaho Field Botany class of 2013, Alexa DiNicola, Beth Corbin, and I found some additional populations. In the Succor Creek drainage of both Oregon and Idaho there are a few scattered outcrops of the same tan, volcanic ash-tuff that is found in Leslie Gulch. Some of those outcrops support populations of narrow-leaved monardella, just as one might expect of a substrate-limited endemic species. A third metapopulation of narrowleaved monardella is known from Chalk Basin, along the west side of the Owyhee River north of Rome, Oregon, with plants found on the same tan, volcanic ash-tuff outcrops.

There are other more widespread species that occur on these same relatively barren outcrops in all of these locations, including woolly sunflower *(Eriophyllum lanatum)*, snakeweed *(Gutierrezia sarothrae)*, narrowleaf wirelettuce *(Stephanomeria minor)*, silverleaf phacelia *(Phacelia hastata)*, Chambers' twinpod *(Physaria chambersii)*, desert princesplume *(Stanleya pinnata)*, Nuttall's sandwort *(Minuartia nuttallii* var. *nuttallii)*, few-flower pea *(Lathyrus pauciflorus* var. *pauciflorus)* which also appears to have a slightly atypical morphology than other populations of this taxon, blue flax *(Linum lewisii)*, whitestem blazingstar *(Mentzelia albicaulis)*, northern Indian paintbrush *(Castilleja angustifolia)*, bitterbrush *(Purshia tridentata)*, and Indian ricegrass *(Achnatherum hymenoides)*.

Although it is easy to find narrow-leaved monardella on a trip to Leslie Gulch, the limited distribution of this new species puts it in the Critically Endangered category according to criteria of the International Union for the Conservation of Nature (IUCN). Only two locations are known for Idaho. The easiest place to see and smell this plant is along the roadcut 7.3 miles southwest of the Oregon/Idaho border on Hwy 95 between Marsing and Jordan Valley, in the tan-colored outcrop on the east side of the highway. For further reading on the unique botanical curiosities of Leslie Gulch, I recommend Findley (2004).

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Don was born in Salem, Oregon, and grew up all over the US. He took his first biology class from Dr. Martha Springer at Willamette University and transferred to Colorado College where he completed a BA in biology in 1973, discovering field botany in his senior year studying under Dr. Jack L. Carter. After completing his MSc in botany at University of British Columbia, working with Dr. Iain E.P. Taylor on a biochemical problem, but also studying with Dr. Wilf Schofield and others, Don decided that he loved both teaching and botanical research. He earned his Doctor of Arts degree in biology at Idaho State University (1979) working with Dr. Jay Anderson. There he began studying the botany of Steens Mountain in eastern Oregon, often studying with Dr. Karl Holte. After brief postdoctoral employment at University of California, Davis, where he worked on post-harvest physiology while spending weekends studying vernal ponds of northern California, he taught botany and physiology at Colorado College (1981-1984). While Assistant Professor of Biology at Rollins College in Florida (1984-1989), Don returned each summer to Steens Mountain and Colorado to pursue his growing love of floristics. In 1989 he took a faculty position at The College of Idaho in Caldwell, where he teaches field botany and a variety of biology courses and serves as Curator of the Harold M. Tucker Herbarium. His floristic research resulted in the *Flora of Steens Mountain* (2000), and he continues to study the floristics of SE Oregon, SW Idaho, and N Nevada. His work has turned up many interesting problems, such as the one described in this article, which he continues to pursue with his wonderful and talented undergraduate students.